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November 16, 2004

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By Authority of the
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13281 U.S. PTO

PTO/SB/16 (08-03)
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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60/520658
111803

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TITLE OF THE INVENTION (500 characters max)

POSTAL HANDLING

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☑ Customer Number: 28204

OR

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ENCLOSED APPLICATION PARTS (check all that apply)

☑ Specification Number of Pages 41
☐ Drawing(s) Number of Sheets
☐ Application Data Sheet. See 37 CFR 1.76
☐ CD(s), Number
☐ Other (specify)

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27.
☐ A check or money order is enclosed to cover the filing fees.
☑ The Director is herby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 502464
☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE Amount ($): 160.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☑ No.
☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE Jacob Eisenberg

Date 11/18/2003

REGISTRATION NO. 43,410 (if appropriate)

Docket Number: 2003P17657US

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PROVISIONAL APPLICATION COVER SHEET
Additional Page

PTO/SB/16 (08-03)
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Docket Number 2003P17557US

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Number 2 of 2

Revenue Protection & Recovery for Redirections

Overview

Basically, the operational model for UK Redirection (as well as for other posts that charge a fee for their forwarding service) is as much about turning the ad hoc Forwards, (i.e., inscribed with a new address by the current resident), into revenue as it is about automating the redirection of paid Forwards. This is a new aspect of the Redirection problem, related to whose solution we believe there is patentable novelty that Siemens Dematic seeks to protect.

The following is the basic schema for Redirection Revenue Protection and Recovery wherein a party fails to pay for the postal authority service but rather asks the current resident to mark-up the envelope with their new address and put it back into the mail either by returning it to the carrier or more commonly just dropping it off in a mail box as regular post. Posts, who then encounter this marked-up mail piece tend to simply deliver it rather than enter into issues related to unilaterally destroying it.

Basic Procedures

The Revenue Protection & Recovery for Redirections involves the following steps:

Each envelope that has been sorted via automatic equipment has a barcoded Tag Id (TID)[1] that when scanned upon re-entry into the network (as an ad hoc Forward) is detected as an expired TID. This flags the envelope as an exception that can be either specially image processed or displayed to an operator to confirm it is an ad hoc Forward.[2]

The ad hoc forwarding address (likely handwritten) will be video coded and used to notify the moved party by special postal authority letter that the post will continue to forward such ad hoc mail pieces for X days and cease thereafter if no official forwarding service is requested. Alternatively the post can withhold from delivery such ad hoc forwards in the interim in anticipation of the moved party establishing a paid Forwarding account. This version of Forwarding would also require provision of some storage infrastructure for easy storage and access of such ad hoc Forwards for delivery once an account has been established or for destruction after a given grace period.

The failure of a new address party to acknowledge a request to set up a Paid Forwarding Account can be used to established by the post a legal policy of with withholding service and destroying mail pieces.

A further enhancement of this technique allows the initial video coding of the ad hoc address to be loaded into a special directory to facilitate any future video coding by providing a special restricted directory for Interactive Video Coding processing to

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[1] Most automated posts currently have adopted TIDs

[2] Where no TID is used we would perform special image processing on each mail piece during address block location to detect those mail pieces that appear to have an ad hoc redirection inscribed.

recover and confirm said address and addressee when further mail pieces are encountered. Such a video coding process will require the addition of a specific addressee AKS step because the name will normally not be part of the ad hoc inscription.

Phased Redirection

Concept Underlying Phas d Forwarding

When a mail piece is totally online OCR resolved, D+1 Redirection is not a problem (assuming, that is, that a re-labeling step we can work into the D+1 timeline). The stumbling block for D+1 Redirection is the handling of rejects that require redirection.

Phased Redirection uses 2 types of directory flags to maximize D+1 redirection potential and a third flag to signal a difficult redirection candidate that requires a special operator validation step even if resolveable by Online OCR.

.Although, per Swedish Post, 50% of the mail will be "flagged", I assume only about 10% will actually required physical forwarding and re-labeling. Roughly assuming that we are able to resolve about 60% of the Redirection via Online OCR, this leaves the remaining Redirections (about 4.0% of total mail volume) to be detected and rerouted by Phased Redirection during Integrated Interactive Video Coding. We need to resolve these redirections by examining together Delivery Point and Addressee to confirm the redirection while being able to also discard the "False Alarm" redirection domino effect (topic a. above) that results from mail addressed to residents at the same address but who have not requested any redirection.

Phased Redirection uses 3 different "Redirection Information Flags" to control processing so that D+1 is maximized and high error potential forwarding decisions are not done by default. The Redirection Information Flags are associated to the records in the Address Data Base at the Delivery Point (street/house number) level. They are

1. **Priority Handling Flag**: The subject Delivery Point contains one or more addressees who require redirection outside the delivery domain of their original sorting center.

2. **Offline Handling Flag**: The subject Delivery Point contains one or more addressees who require redirection within the delivery domain of their original sorting center.

3. **Validation Required Flag**: The subject Delivery Point contains one or more addressees whose name(s) is not sufficiently differentiated from family members or other residents to allow an automatic Redirection decision without operator validation. (The Validation Required Flag occurs in addition to the Priority and Offline Flags and effects Online as well as offline Interactive Video Coding)[1].

[1] When a Validation Required Flag is encountered, whether during Online OCR processing or during Integrated Interactive Video Coding – Steps 1 - 2, the mail piece is sent to the Redirection Holding stacker where it is held for operator Confirmation and then re-feed during Outward Sorting. The Confirmation step can be integrated into Selection processing using background screen color (per An Post experience) to implicitly prompt an operator to perform the Selection in a manner that Validates whether a condition like a given name is present or not. Interestingly such a specific *"Question-step* validation is currently reported by La Poste to be done in their street name video coding with a throughput of approximately 1,300 images per hour.

Phased Redirection is coupled with Integrated Interactive Video Coding as follows:

OUTWARD: *Offline R ject Mail & Flats – AEG, TOP*

For the above sorting equipment it is assumed that all video coding, including postal code, is done offline because of the lack of sufficient delay line time. Hence, all steps of the Integrated Interactive Video Coding process are performed offline with at least Steps 1 and 2 done continuously in parallel with the Outward Sorting and being periodically re-fed during Outward Sorting.

Normally with such totally offline video coding re-feed can begin after entering postal code so the mail pieces can then be outward sorted and any additional Inward video coding will be performed during Travel - Time. However when Integrated Interactive Video Coding is used to drive Phased Redirection, we need to also detect any Redirection Information Flags before mail pieces can be re-fed and video coding completed during Travel-Time. Hence, in addition to postal code, either via OCR Retry or Step 2: *House Number/AKS* entry; we need to determine at least to the Deliver Point level the presence or absence of the respective Redirection Information Flag described above. Based on these Redirection Flags we can load balance video coding as will now be discussed in more detail.

Phased Redirection Processing Alternatives

Phased Redirection begins once a mail piece has Post Code and House Number/AKS -- either via Online OCR or Integrated Interactive Video Coding **Steps 1 & 2.** Roughly 1/3 of the rejects have no OCRed Postal Code and require both Steps 1 & 2. The majority of rejects however require only **Step 2**: *House Number/AKS* since they already have postal code via OCR.

At the completion of Steps 1 and 2 of Integrated Interactive Video Coding, either the OCR Retry has managed to totally resolve the rejected address through addressee if required or at least from an AKS perspective we have isolated a Delivery Point and can then make a "worse case" level of processing decision based on any Information Flag that may be present as follows.

Priority Handling Flag – before re-feed, video coding needs to continue, as required, through Steps 3 – 5, to determine if a Redirection condition is present that would change the Outward Sorting destination to a Sorting Center <u>different from</u> to what is written on mail piece.

Offline Handling Flag – can be re-fed without additional video coding since all remaining video coding steps can be performed during Travel -Time because if a Redirection is resolved it will still be deliverable from the addressed Sorting Center.

The number of operator required for OUTWARD: *Offline Reject Mail & Flats* is determined based on the video coding load projected for the Swedish Post AEG and TOP equipment weighted by the relative frequency of Priority and Offline Handling Flags. As will be further detailed in the next section, the total labor pool for OUTWARD: *Offline Reject Mail & Flats* consists of dedicated staff plus use of the peak load staff pool from OUTWARD: <u>*Online Reject Handling*</u> when the online video coding load does not require their support to remain an Online process. (Figure 1) This shared resource

scheme is a variant of the online ←→ offline load balancing modeled by Michael Zettler for Hybrid Sorting. It is further detailed in the next section.

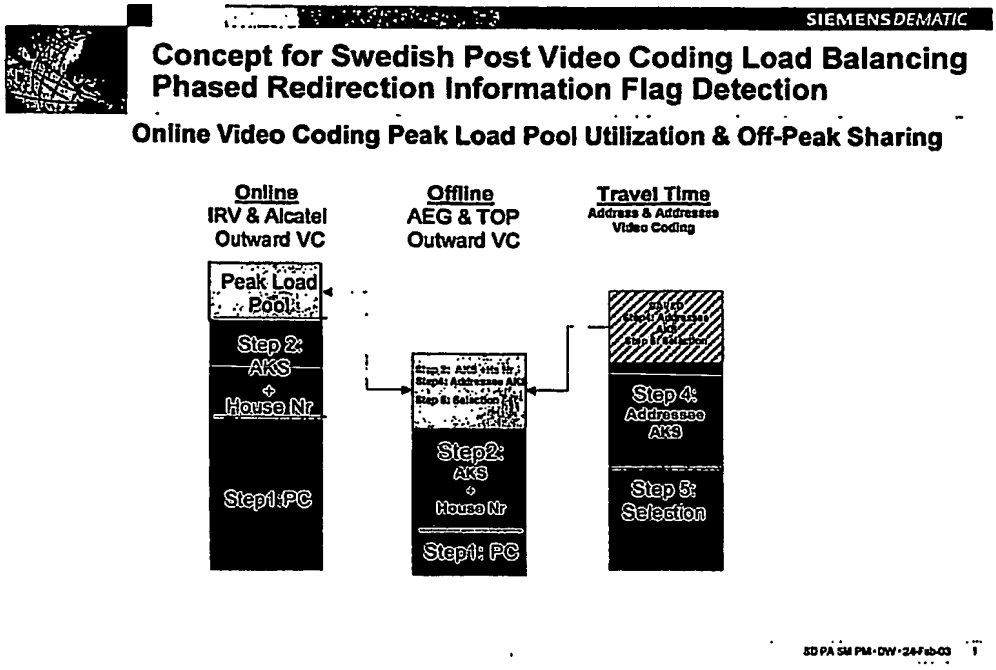
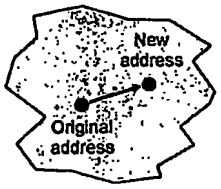


Figure 1

Phased Redirection using 3G Interactive Video Coding
Forwarding Flags

Original Sorting Centre

The Letter is forwarded to an address that lies WITHIN the domain of the original sorting centre

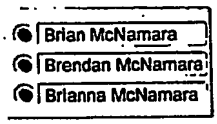


New Sorting Centre

The Letter is forwarded to an address that lies OUTSIDE the domain of the original sorting centre

Validation Handling

The original address has one or more current residents whose names are so similar to the adressee's name that they can not be differentiated by OCR



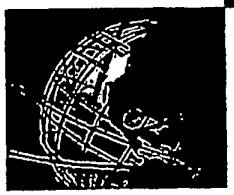
OUTWARD: *Online Reject Handling – IRV, Alcatel*

OUTWARD: *Online Reject Handling* assumes that the IRV and Alcatel equipment provides a
12 – 16 second delay line.

During this online delay, IRV and Alcatel rejects are coded through Step 2 of the Integrated Interactive Video Coding process. The logic is, once again, that by the completion of Integrated Interactive Video Coding: *Steps 1 and 2*; either via entered postal code and OCR Retry resolving the rejected address through a Redirection Information Flag determination or from entry of a Step 2: AKS + House Number, we have isolated a Delivery Point and can then make a "worse case" level of processing decision based on any Redirection Information Flag that may be present.

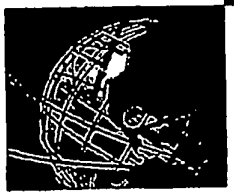
The Offline Handling Flag results in the same deferral to offline Travel-Time processing as outlined above for Outward: *Offline Reject Handling* and the mail piece can be online sorted. However when we encounter a Priority Handling Flag, the subject mail piece is now sorted to a special **Redirection Holding Stacker** where it is held offline for a given period until its Redirection status is determined by giving it priority for Steps 3 – 4 of Integrated Interactive Video Coding

The load balancing of the Online Steps 1 and 2 is the challenge we handle as shown in Figure 1 whereby we set aside a pool of sufficient staff to handle the peaks in Online Steps 1 and 2
work load. However, during online off-peak we also use this labor pool to reduce offline video coding backlog. This discretionary staff, if not assigned to Outward: Online Reject Handling — Steps 1 & 2 or resolution of Priority Handling Flagged rejects, results in reduced Offline Travel Time labor hours as depicted schematically in Figure 1. The end to end load balancing described above, not only makes feasible online handling of Steps 1 and 2 for IRV and Alcatel, but also reduces the otherwise high risk of Online time-out for even postal code keying during collection mail peak load periods.



Endorsement Video Coding/Verification Matrix

Do Not Forward	Forward Pricing	Do Not Open	Do Not Forward
First Class	Do Nt For	**Do Not Forward**	Not Forwardable
Do Not Forward	**Do Not Forward**	*Do Not Forward*	Please Do Not Forward



Endorsement Video Coding/Verification Matrix

Do Not Forward	Forward Pricing	Do Not Open	Do Not Forward
First Class • 1st Class • 2nd Class • RTS •Do Not For •Delete/error	Do Nt For	**Do Not Forward**	Not Forwardable
Do Not Forward	**Do Not Forward**	*Do Not Forward*	Please Do Not Forward

Smart Polling

Background

In many forms of artificial intelligence, multiple algorithms are run in parallel on the same input data to attempt to gain performance and reliability by combining in some manner the respective final answers. In theory, this should be a very reasonable approach in particular where each of the said algorithms was independently developed. We refer to the degree of uniqueness in each of the underlying algorithms as "orthogonality" borrowing from the linear algebra concept of independent vectors spanning the largest space.

Although, in theory running multiple independently algorithms should result in improved overall performance and reliability; In the real-world and under practical constraints, we quickly run into problems. A good example is in the field of Optical Character Recognition (OCR) processing. As OCR is a major practical endeavor and representative of other such artificial intelligence pursuits, the following patent specification will focus on OCR and in particular its postal application but not to the exclusion of other similar applications.

In postal operations we frequently refer to OCR as if it where a single logical entity. However, in reality, the OCR artificial intelligence process is the composite of at least 4 separate, self contained complex processes:

- **address block location:** from all the information on the face of the envelope
- **binarization:** transformation of gray-level image into binary
- **OCR processing:** map and identify an image as an alpha or numeric character
- **data base lookup;** rationalizing the stream of successive characters output by the OCR by matching against an elaborate set of relational databases containing postal code, city, street and even addressee information that are used to until a destination – i.e., referred to as a sorting decision is logically arrived at.

This conglomeration of processes which for brevity in the remainder of the patent specification we will continue to refer to as OCR, essentially act in concert to take a scanned image of the face of an envelope and map it, with reasonable certainty, into a sortation decision corresponding to the address that was machine printed or handwritten on a mail piece by the sender.

Clearly, however, although the final determination of the OCR process requires consistency of a series of directory matches, there are numerous error paths that can lead to false sorting results: missorts or anomalies that in turn lead to incomplete sorting results: i.e., rejects.

Additionally, if we re-look the above OCR process from a development perspective, the inherent complexity of each of the respective processes would reasonably lead two equally talented groups of people to have a very high likelihood of solving the

respective technical challenges in very different ways. Hence, we can arrive logically at the assumption of OCR algorithm-to-OCR algorithm orthoganality. Furthermore the premise is logical that if we could somehow "Vote or Poll" to determine which set of OCR results are more reliable in a given setting or otherwise combine results; the resultant conclusion would be a superset of both processes resulting in higher accept rates and lower error rates.

Area of Invention

One approach hence to improving the OCR postal resolution rate and reliability has been to run multiple, independently developed OCRs in parallel. Obviously, when the respective results are the same we can accept the sorting decision with correspondingly high assurance/reliability. However the real challenge results from the circumstance where the respective OCR results, when resolved against their directories', yield conflicting sorting decisions. It is this area that is the practice of the following invention and the area of operation requiring inventive improvement

Problem Being Solved

If we reject a mail piece when faced with lack of a unanimous decision from the respective OCRs, then inevitably the use of multiple OCRs will lead to decreased accept rate and corresponding sorting efficiency directly proportional to the number of OCR readers applied in parallel. Hence state of the art has provided for "polling/voting" whereby some criteria, short of unanimity, allows acceptance of a sorting decision. At this point, we are faced with the need to find some objective criteria for decision between multiple independently developed OCRs where, in particular the problem is particularly complicated in the postal area by the inputs (i.e. mail pieces) being completely random and address content being uncontrolled vis a vis quality of imprint.

Prior Art

One mode of including orthogonal OCRs is to introduce additional secondary or reject readers that process only images that failed the Primary reader. This reduces reject rate but does not improve error rate. Hence, to gain the maximum performance benefit from orthogonal OCR readers requires that each of the OCRs handle all images in parallel

One simple method to arbitrate between conflicting results of parallel operating OCRs has been to adopt the sorting decision of the majority of the OCRs. This has the immediate problem that it requires at least 3 separate and independently developed OCRs. Because of the complexity of the OCR process as outlined above and the tedious work involved in developing directories, a prerequisite of 3 or more independently developed OCRs is prohibitively expensive.

Another alternative that has been used where only 2 OCRs are to be used in tandem, is to select the result of the OCR that made the most progress resolving the subject address. This would mean, for example, that if one OCR resolved only City and Post Code and achieved only partial results that where inconclusive with respect to street while the second OCR

managed to resolve City, Postal Code and Street; then we accept the result of the second OCR. This mode of arbitration, while offering a fairly straightforward voting/polling criteria and requiring only two OCRs, however reflects at best a "gut feel" logic – that deeper resolution is more reliable. In reality, however, the assumption of deeper address resolution being the preferred choice, can be frequently shown tobe wrong and ignores a basic of OCR processing – that is: a characteristic of a good OCR is being able to withhold making recognitions that are likely to be faulty. Hence a deficient OCR and/or directory can actual defeat such a voting algorithm.

Another approach used in state of the art to arbitrate between 2 conflicting sets of OCR results is to access and use OCR intermediate and internal datum from each of the OCRs related to what we call Confidence Level of their respective recognitions on a given image string or mail piece address. However Polling arbitration process based on Confidence Level datum has the immediate problems that such internal OCR intermediate datum is normally proprietary and vendors may be reluctant to release it. More importantly, the metrics used by respective vendors to measure "confidence" are incompatible with one another.

Description of Invention

It is the intent of the following invention disclosure to provide a voting/polling arbitration mechanism that requires no access to respective OCR internal Confidence Level datum and :

1. is based on the actual operational characteristics of the respective OCRs
2. is efficient and accurate when applied to the output of as few as 2 OCRs.
3. uses a decision criteria that has a well defined analytical and statistical basis
4. allows respective OCR results to arbitrated on a field by field address which is particularly when we may use specialized OCRs such as those tuned to "foreign" addressing and hand-writing styles

The method of voting/polling arbitration to be described is called Smart Polling because it reduces each OCR, from an arbitration standpoint, to taxonomy of statistically quantified parameter related to the mail piece in question..

Smart Polling assume at least 2 OCRs are being used in tandem, each attempting to resolve the same envelope image into sorting codes to whatever depth of sorting is required by the postal application. The basic process flow of Smart Polling is as follows:

a. Multiple OCRs (2 or more) operate on each scanned envelope image to resolve the required sorting information.

b. Initially each OCR is assumed equal in reliability

c. Where all OCRs agree, the sort decision is accepted without further question

d. Where the respective OCR results conflict in some manner:

    1. Initially, while the system is in tuning and training mode, we reject those

mail pieces that have an OCR conflict

2. The subject mail pieces are sent to Video Coding (supervisory or special operator) to form a learning set specific to calibrating Smart Polling

3. The video coding operator completely resolves the address on the envelope using any state-of-the-art method of video coding. Furthermore the operator responds to a series of system generated questions related to the address and mail piece such as:

   – handwritten versus machine print

   – background color

   – window envelope

   – with or without post code

4. The system also logs for each of these conflict rejects:

   – regular versus flat mail

   – post code related to the respective correct OCR decisions (as determined by video coding)

   (The mail piece and address attributes in points 3. and 4 above are not meant to be an all inclusive list but rather just examples of categories that can be automatically determined even when a mail piece fails in some manner OCR processing)

5. Based on the video coded results, we determine automatically which OCR was correct and list the related mail piece attributes.

6. Using standard statistical techniques, such as Null Hypotheses testing we determine the relative merits of the respective OCRs when a given attribute or set of attributes are present. For example we may determine that handwritten addressed mail pieces we can definitively choose between the OCR alternatives. The same essentially follows for the rest of the attributes that where determine by the video coding operator or by the system for each mail pieces in the initial learning sample. We relate them statistically to a specific choice or bias toward a given OCR in a recognition conflict situation.

7. In operation, once we have sufficiently determined respective OCR performance versus mail piece and address attributes to give us relative assurance to select between conflicting OCR results; we use these statistical inference factors to make a voting/polling decision directly between OCRs.

8. Steps 3 –5 are continued over time with a very sparse sampling (e.g.,

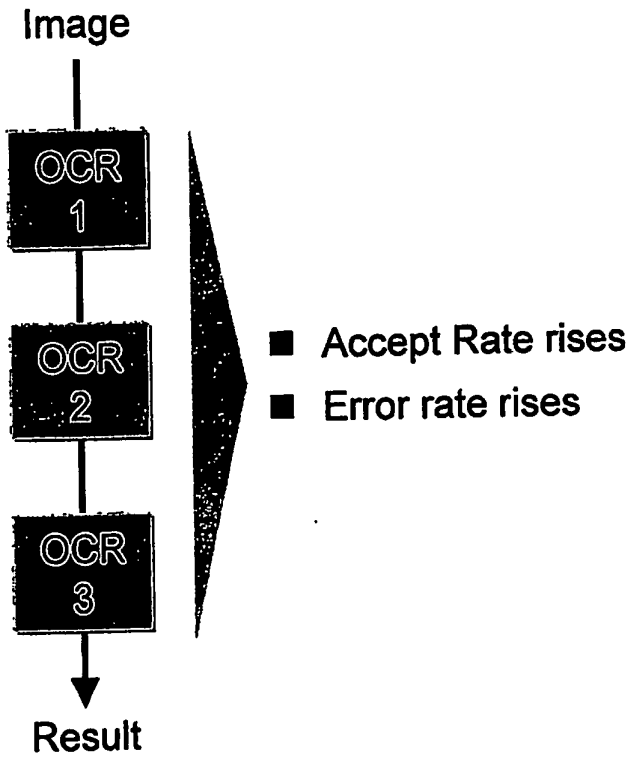
1 in 10 thousand) of conflict recognitions that have been resolved using the bias previously determined from the teaching sample. If we see a significant shift in the computed biases for given attributes relative to the OCRs, the attributes are updated and the biases are changed accordingly, .

Reading Coding Highlights
Customer Perspective

OCR Polling

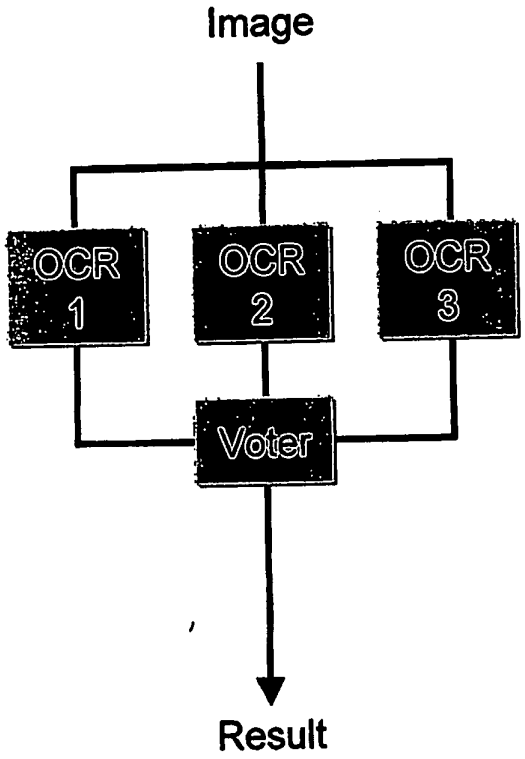
Reading Coding Highlights
Customer Perspective

Multiple OCRs Option 1: Serial Configuration



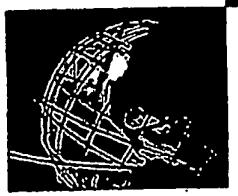
Reading Coding Highlights
Customer Perspective

Multiple OCRs Option 2: Parallel Configuration



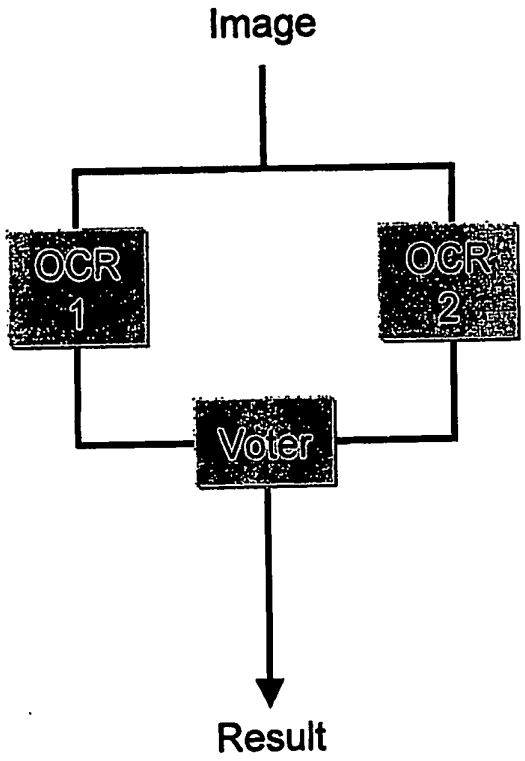
Voting Option 1: Majority Vote

- Accept Rate falls
- Error Rate falls
- Requires at least three OCRs



Reading Coding Highlights
Customer Perspective

Multiple OCRs Option 2: Parallel Configuration

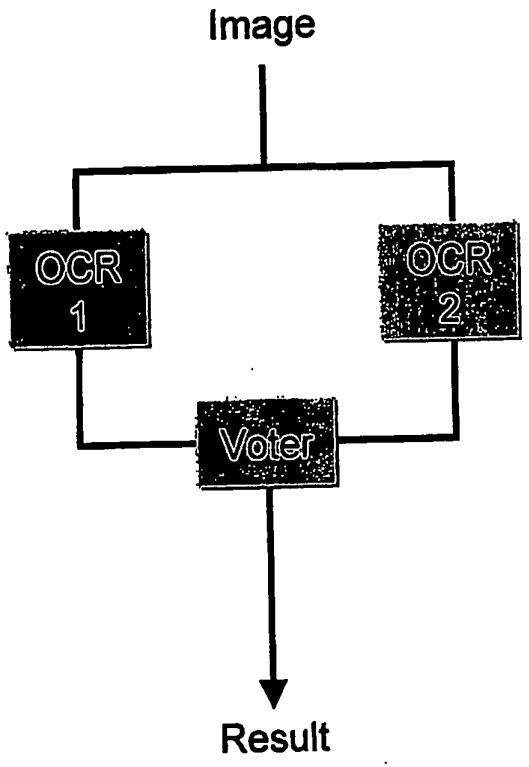


Voting Option 2: Internal "Confidence" Data

- ***Requires only 2 OCRs***
- Accept Rate rises
- Error Rate may decrease
- Requires Vendor "Internal Design" Disclosure
- Requires "Calibration" between OCRs

Reading Coding Highlights
Customer Perspective

Multiple OCRs Option 2: Parallel Configuration

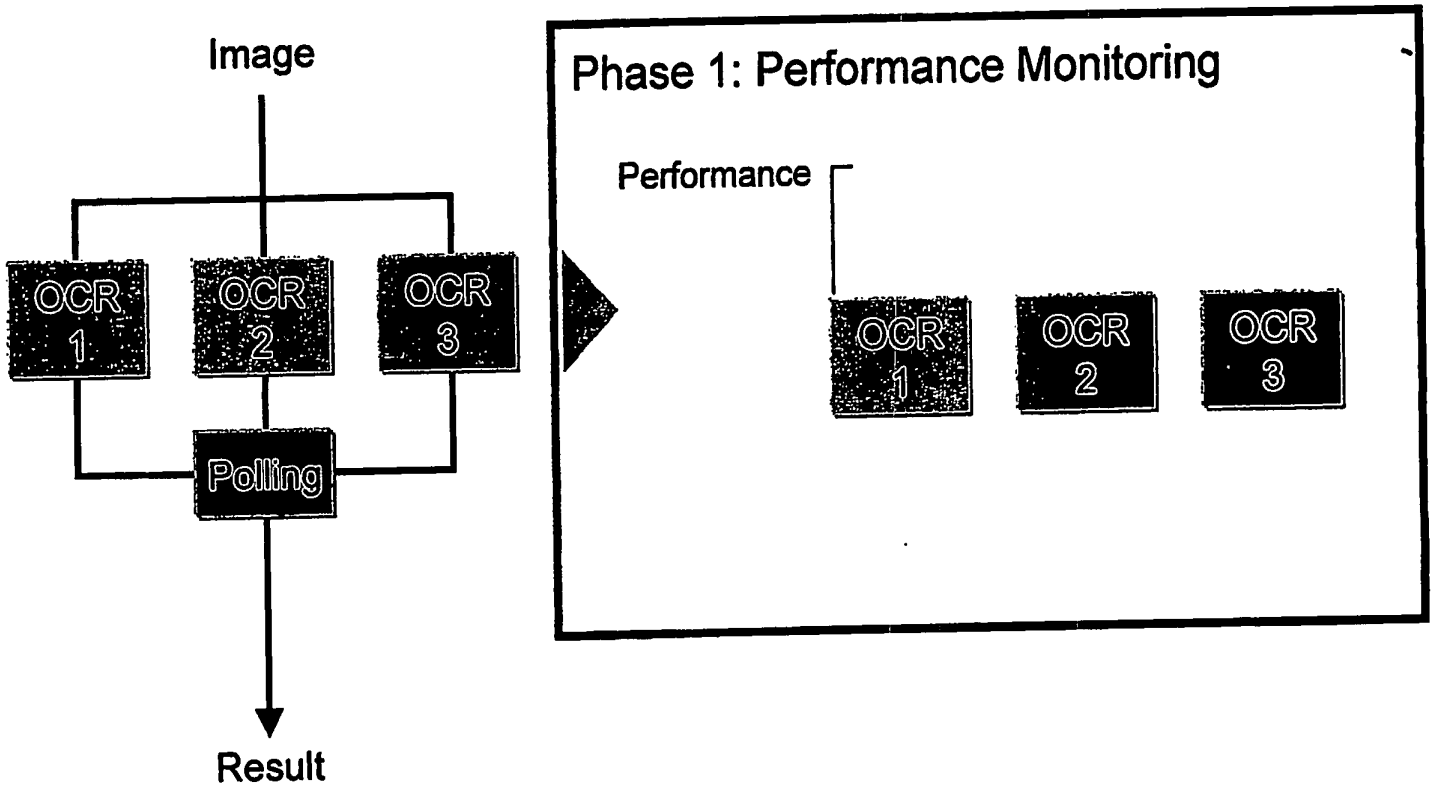


Voting Option 3: Depth of Address Resolution

- ***Requires only 2 OCRs***
- Accept Rate rises
- Error Rate likely to increase
  → Flaw in Basic Concept
- Depth of Resolution Unrelated to Accuracy

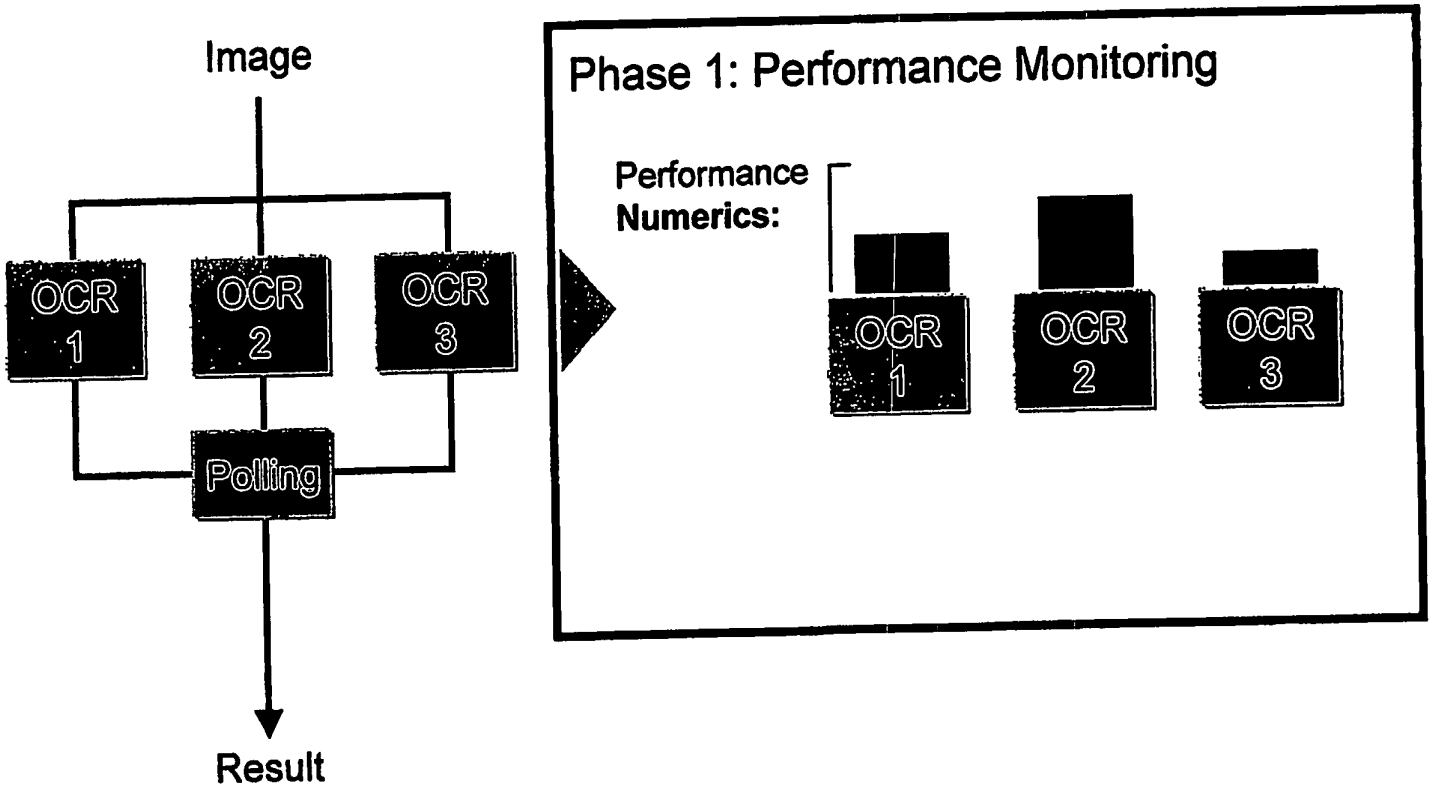
Reading Coding Highlights
Customer Perspective

Voting Option 4: Smart Polling



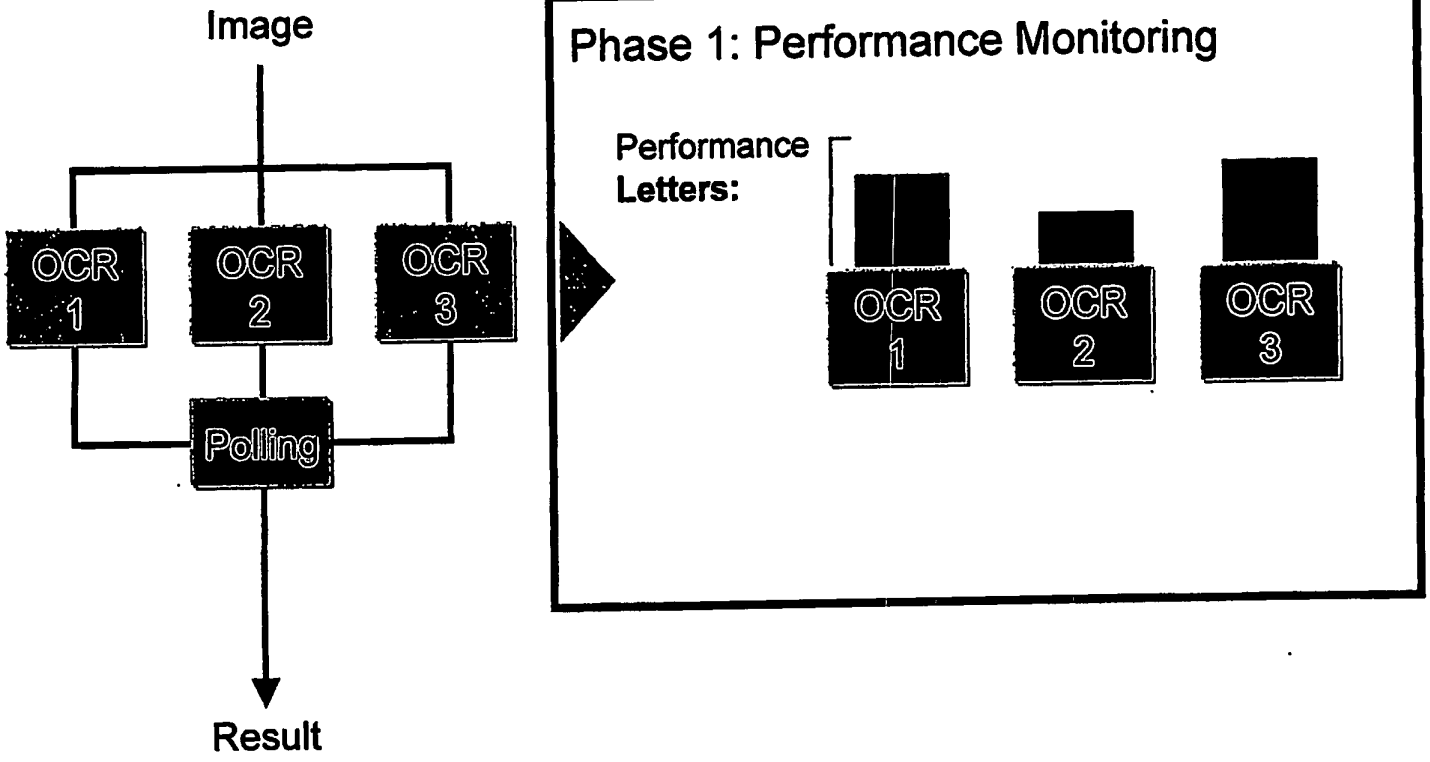
Reading Coding Highlights
Customer Perspective

Voting Option 4: Smart Polling



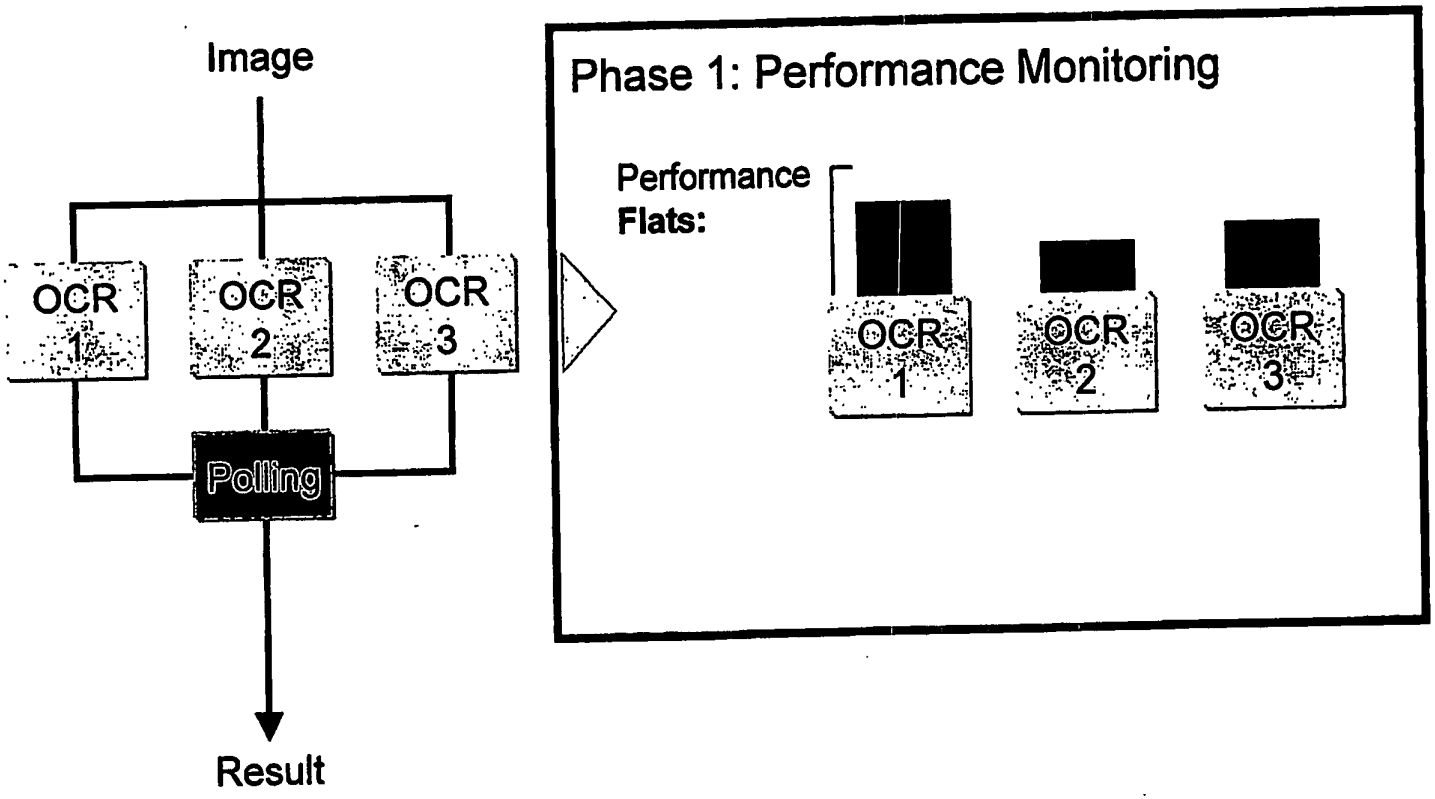
Reading Coding Highlights
Customer Perspective

Voting Option 4: Smart Polling



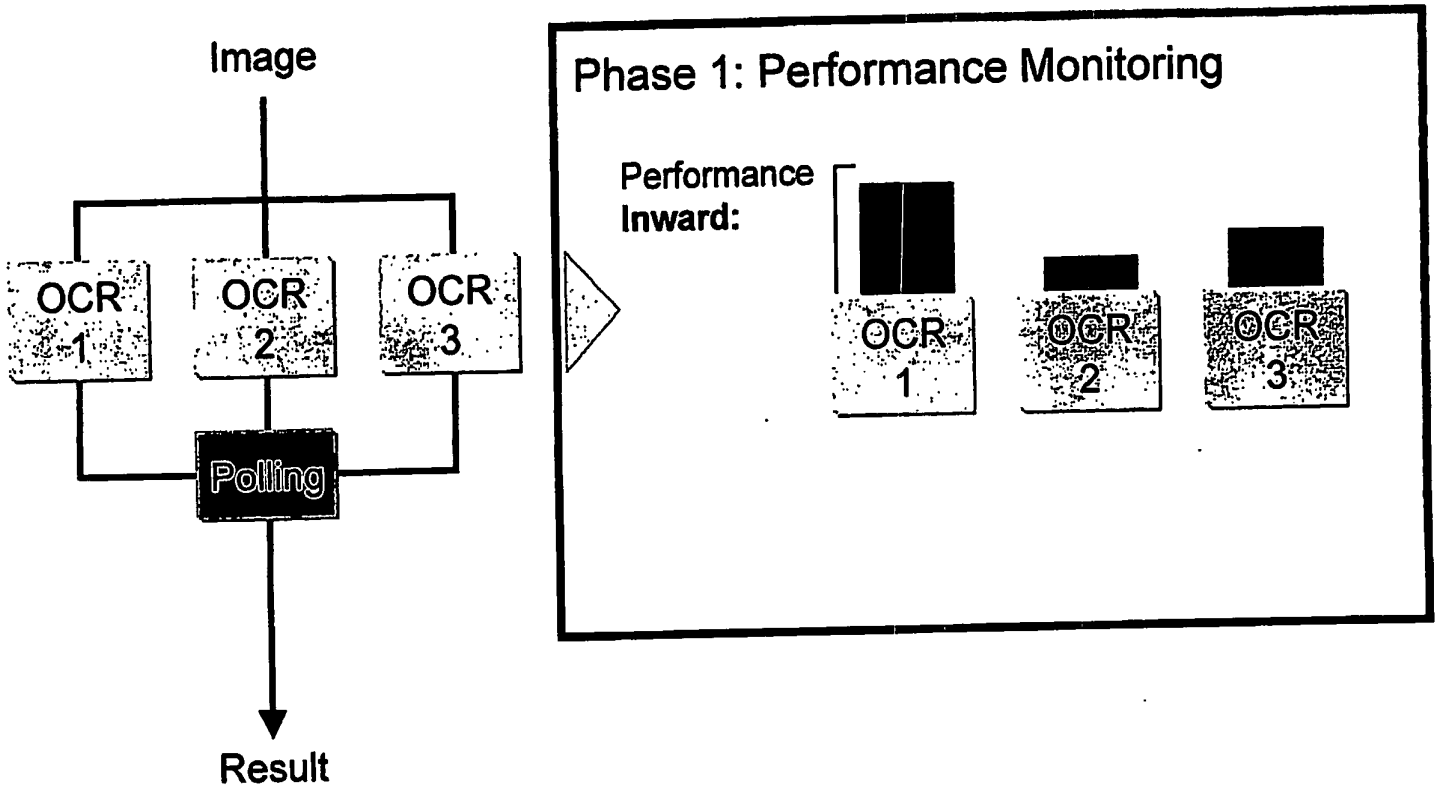
Reading Coding Highlights
Customer Perspective

Voting Option 4: Smart Polling



Reading Coding Highlights
Customer Perspective

Voting Option 4: Smart Polling



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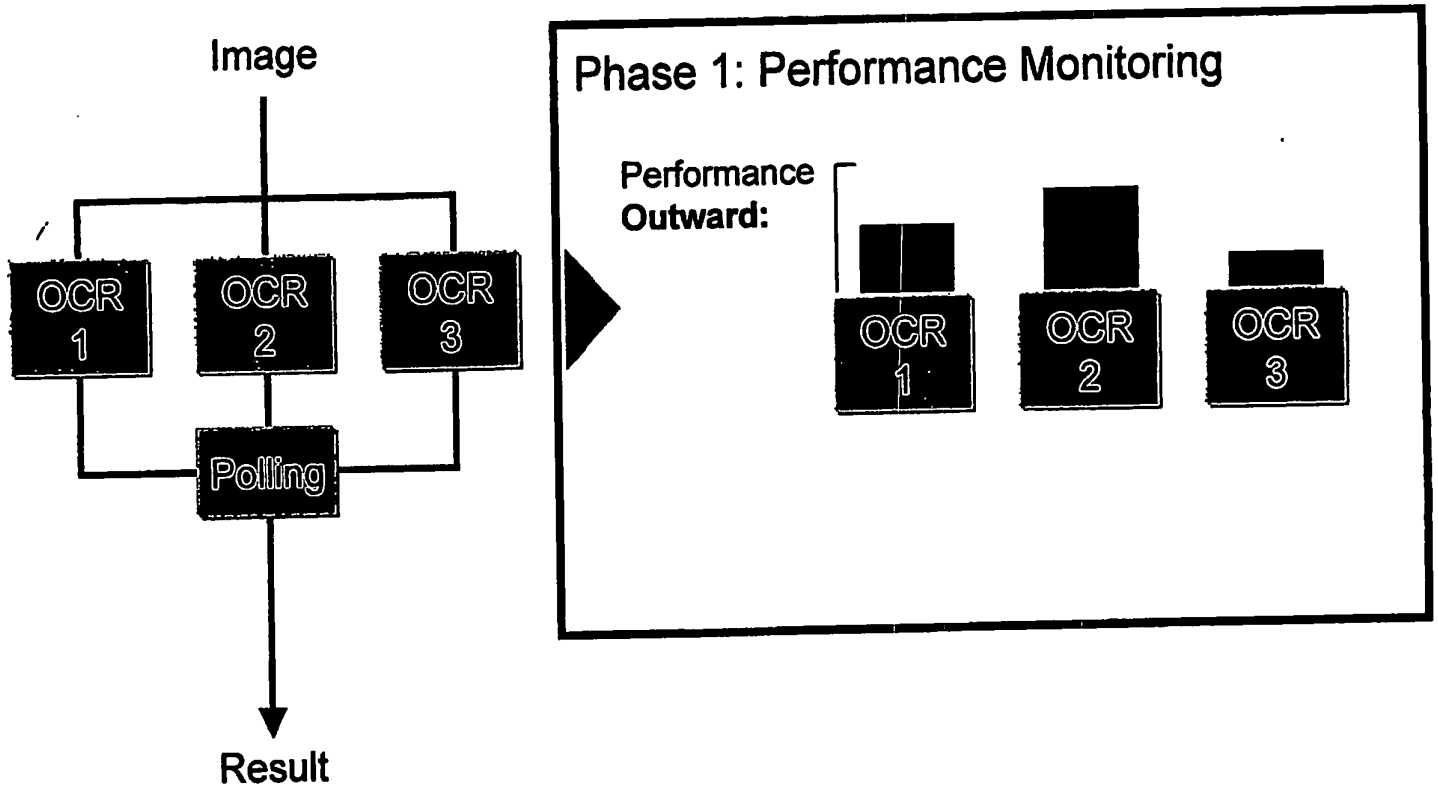
Customer Perspective

Voting Option 4: Smart Polling



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Customer Perspective

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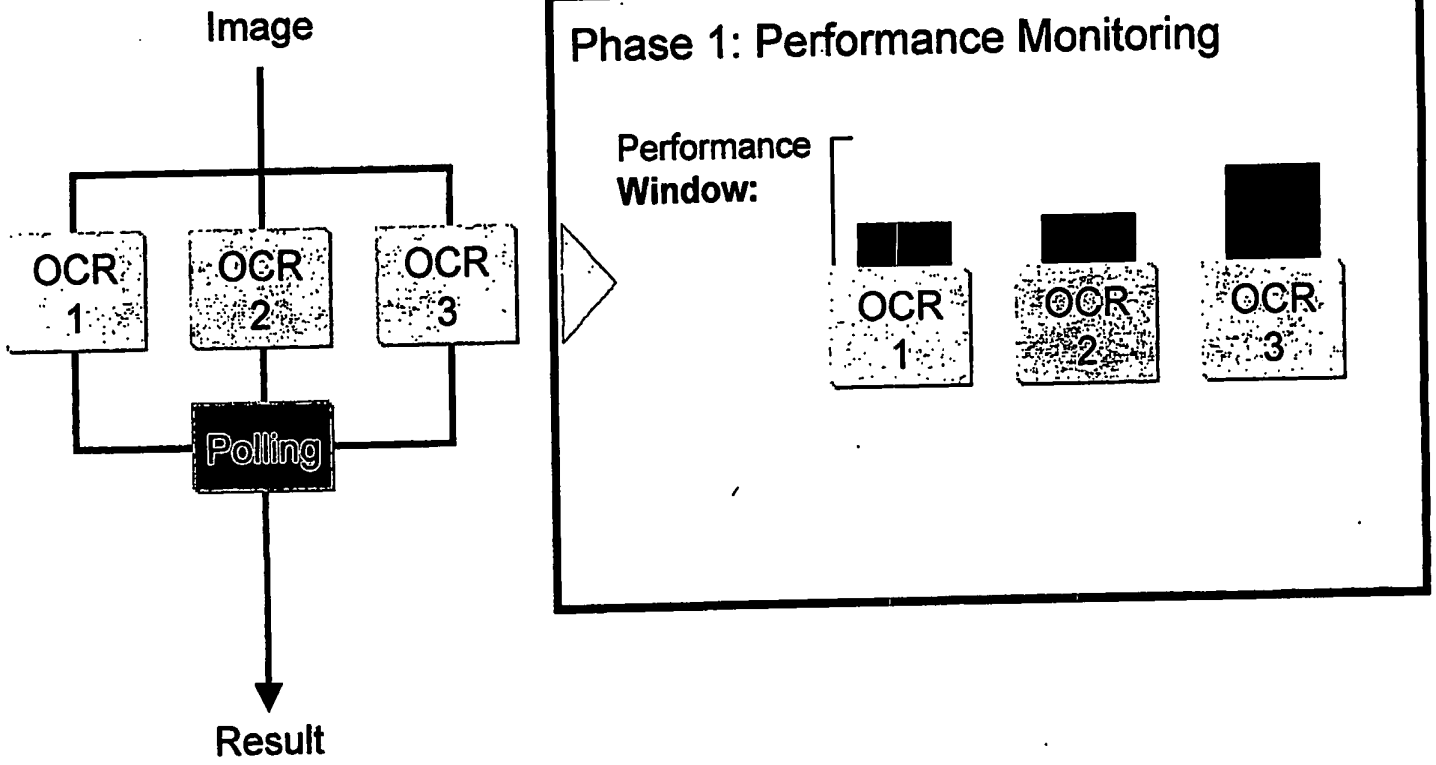

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Customer Perspective

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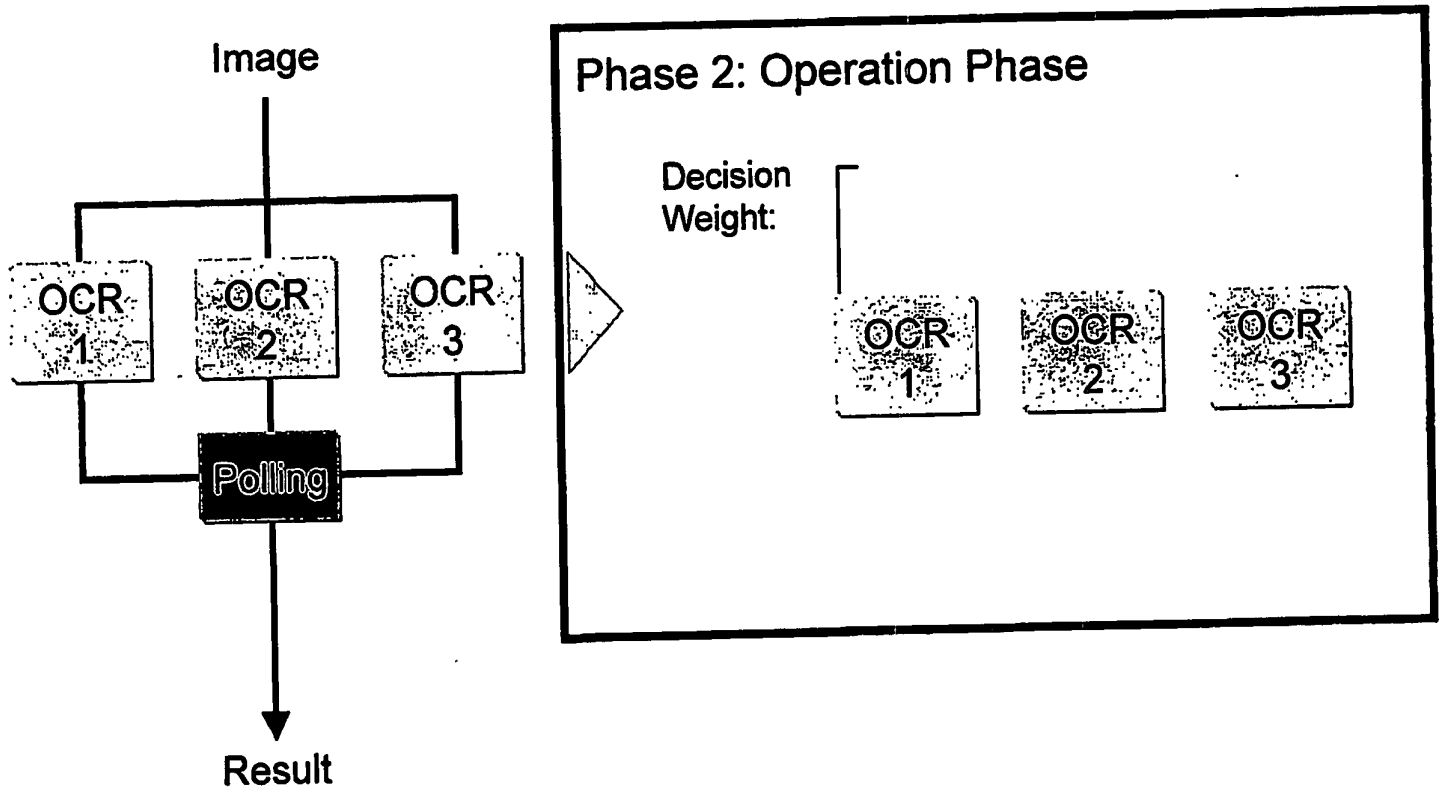

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Customer Perspective

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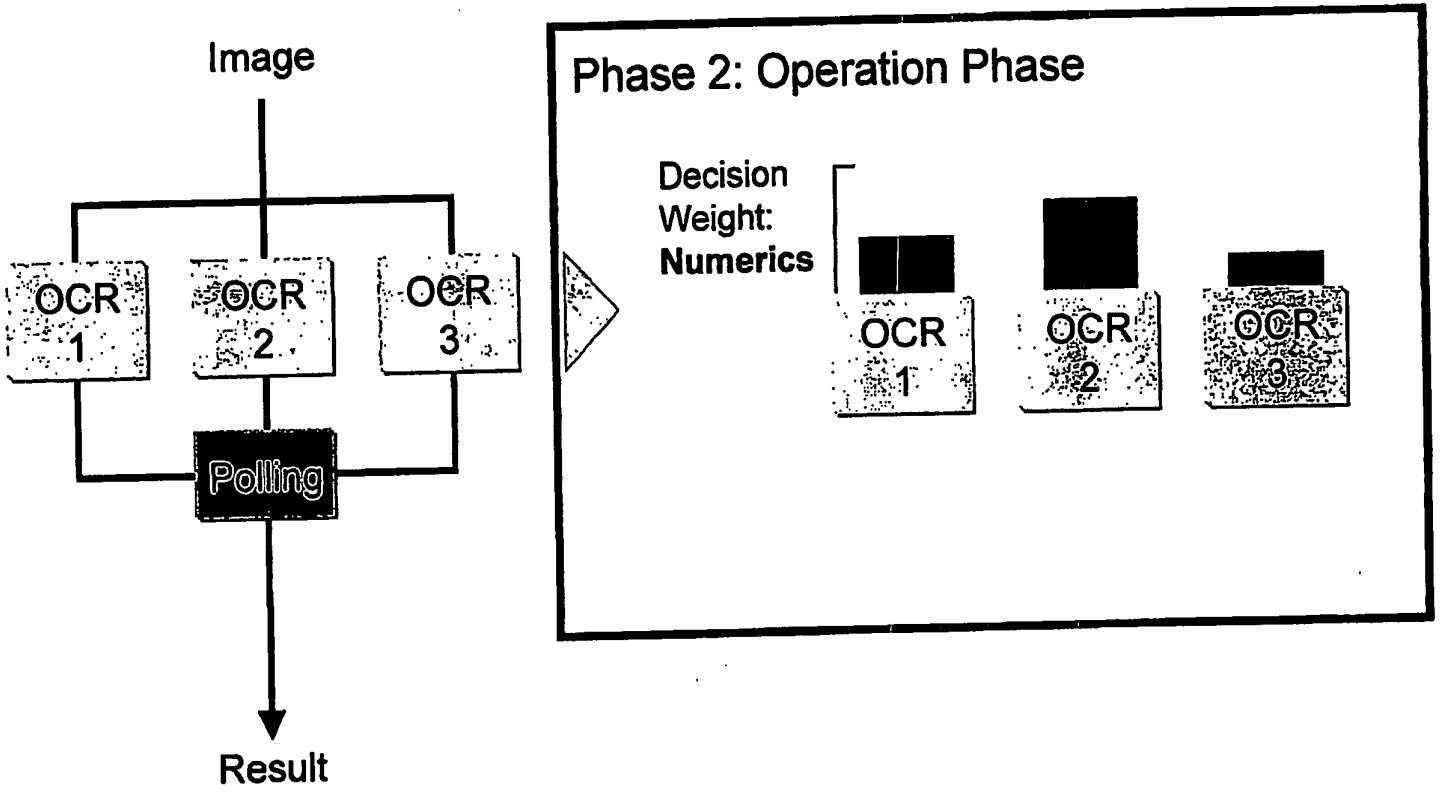

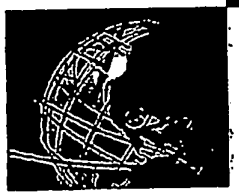

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Customer Perspective

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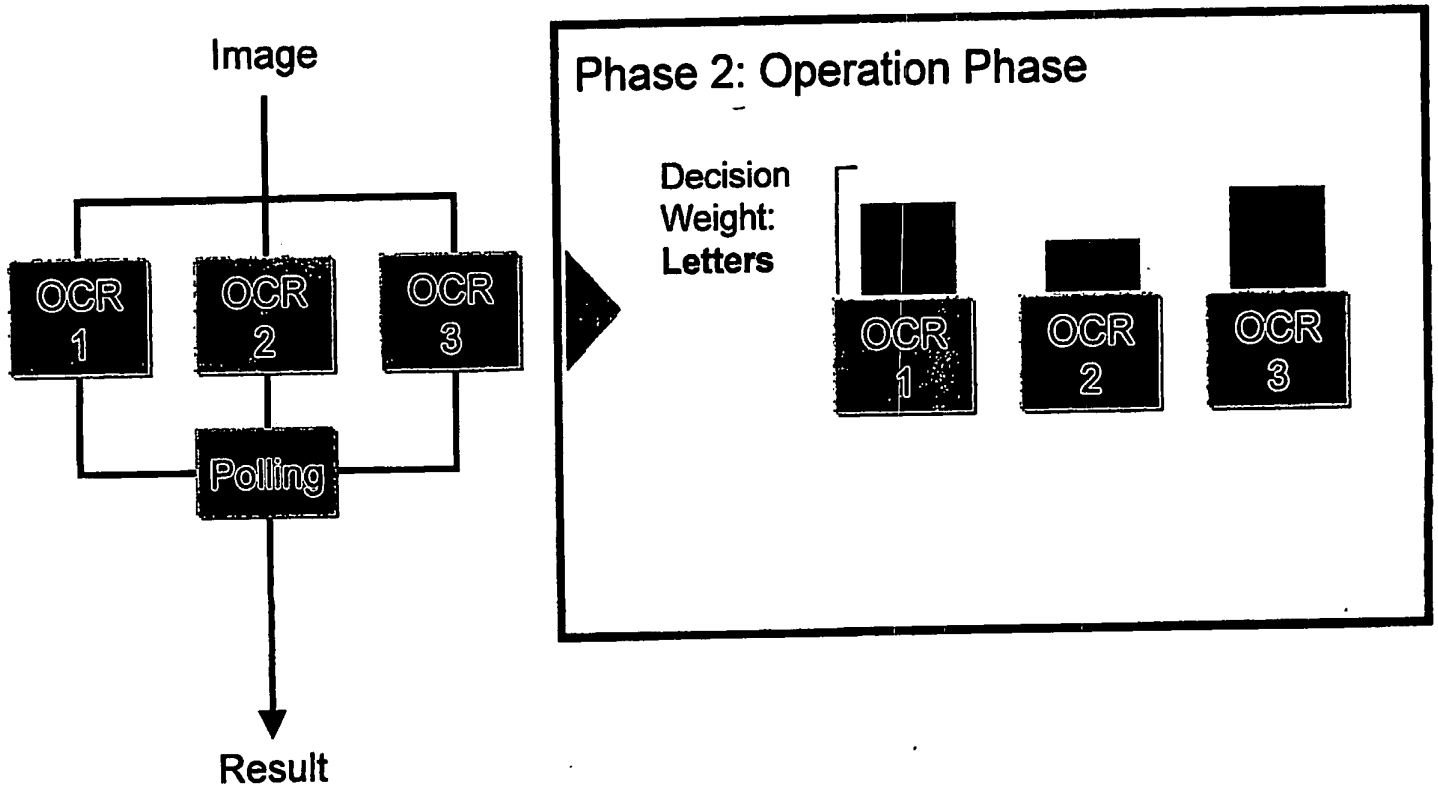

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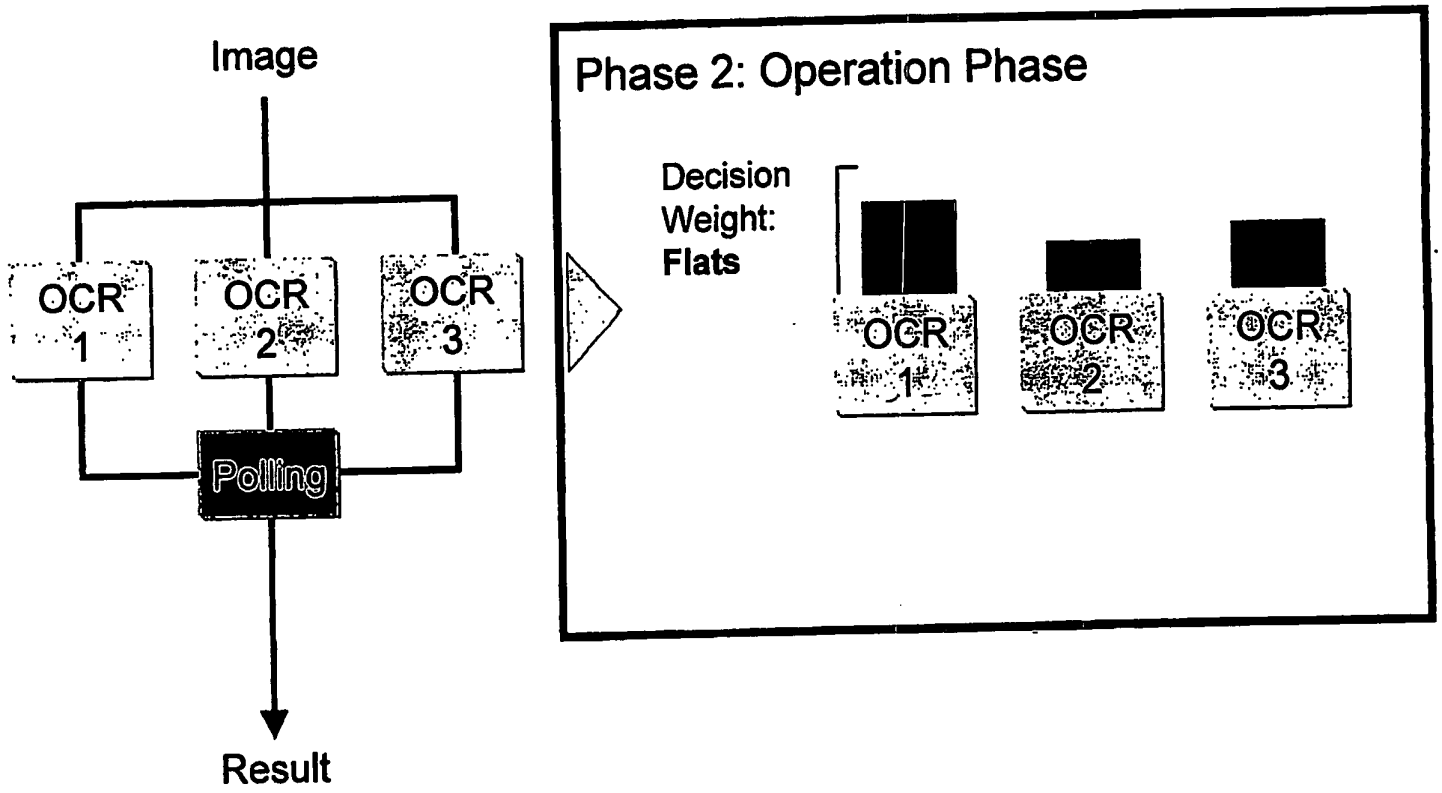

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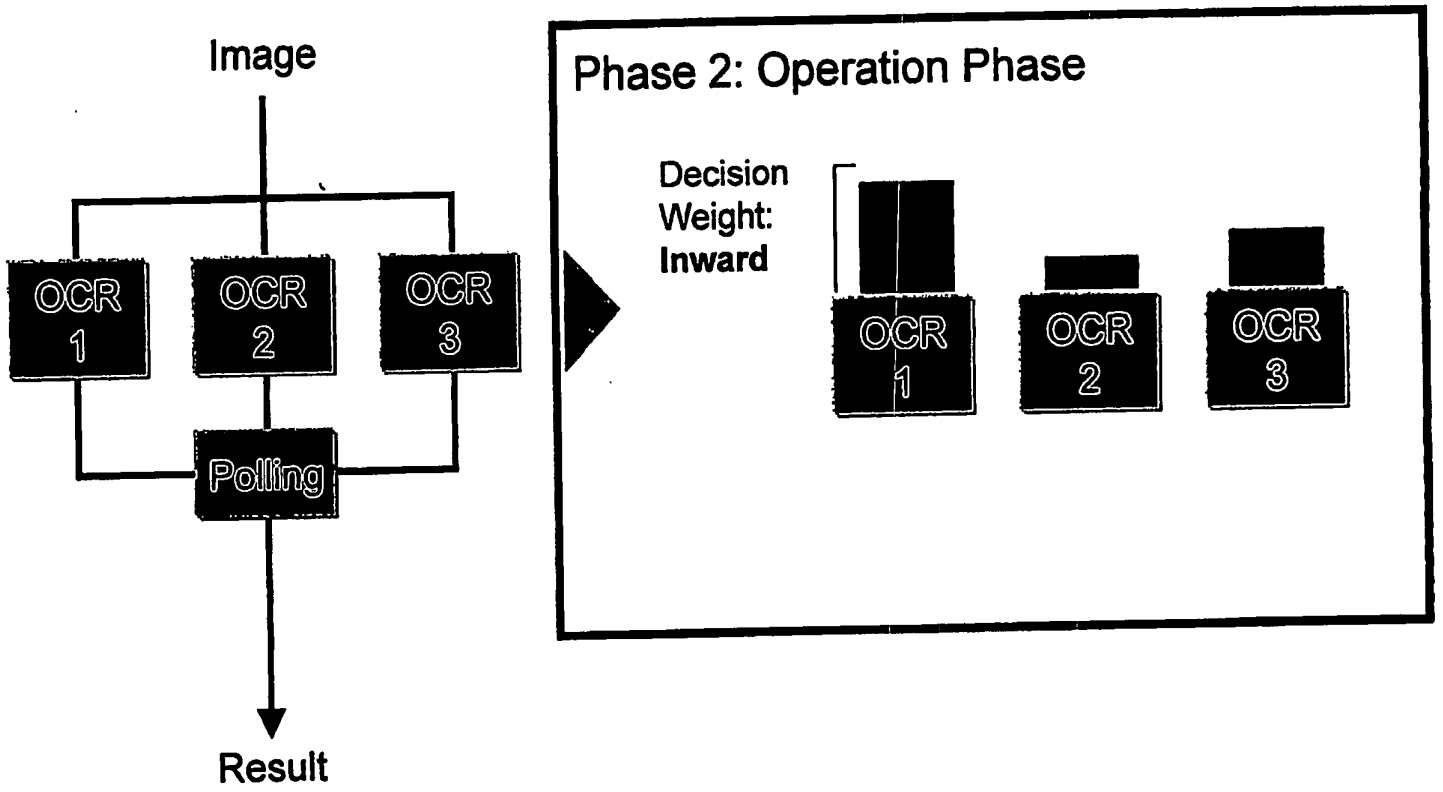

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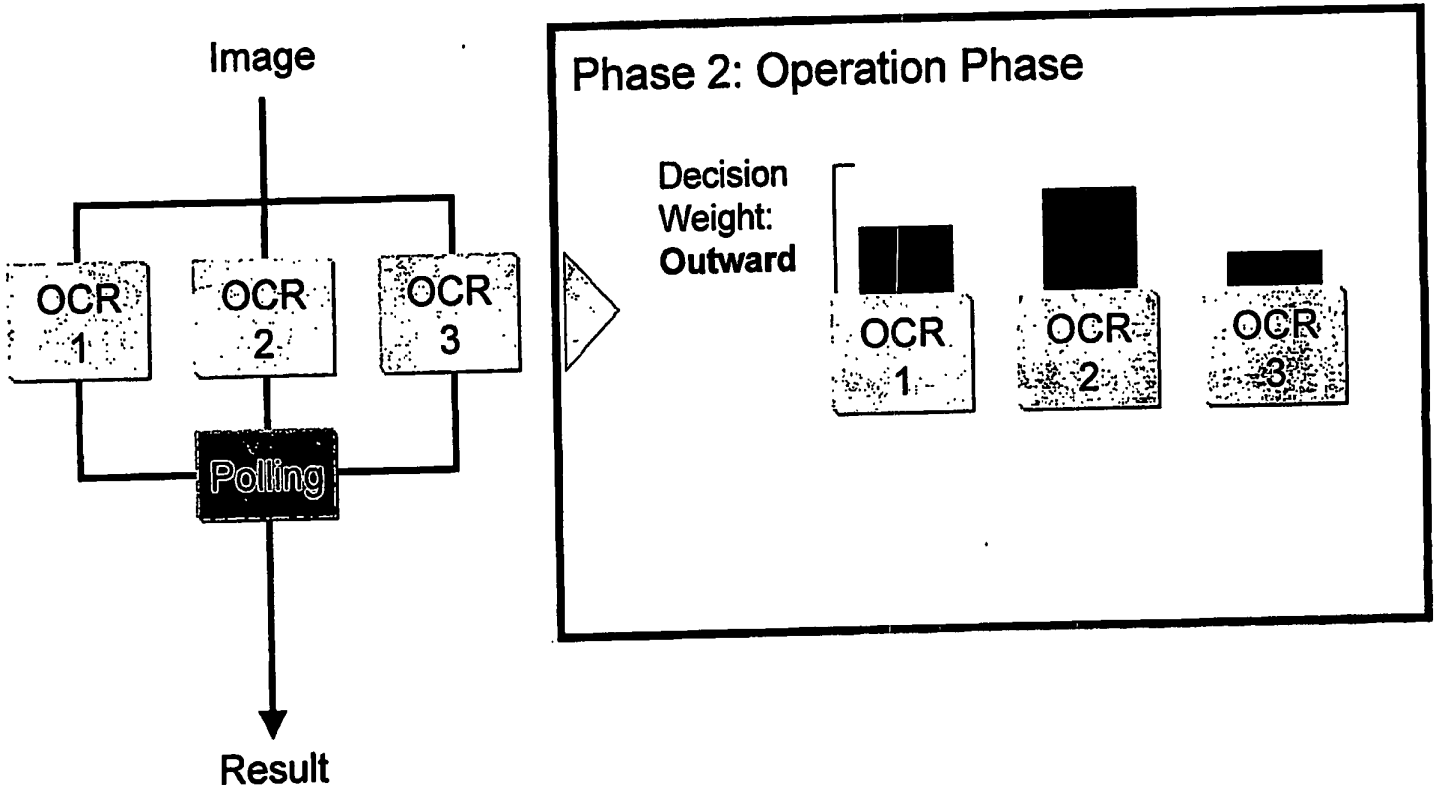

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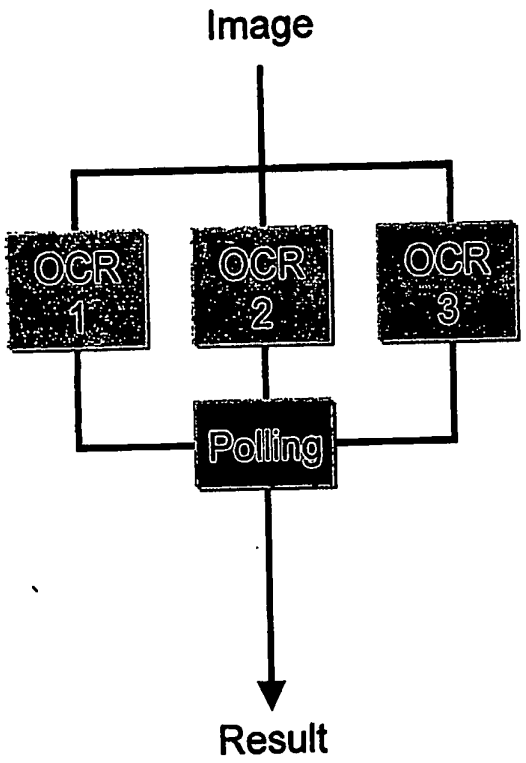


- ***Requires only 2 OCRs***
- ***Handles any Number of Parallel OCRs***
- ***No Vendor Disclosure Required***
- Accept Rate rises
- Error Rate decreases

Data Mining: Sorting & Syst m Error Isolation

Posts, as communication hubs, should view themselves as prime candidates for data mining. However privacy laws and the inhomogeneous nature of postal processing have to date severely limited the ability of posts to leverage on all the information in hand. With the advent of homogenous postal processing platforms such as RC 2000, one major barrier to Data Mining has been removed. Hence we propose in context of RC 2000 the Data Warehousing/Mining for Sorting and System Error Isolation.

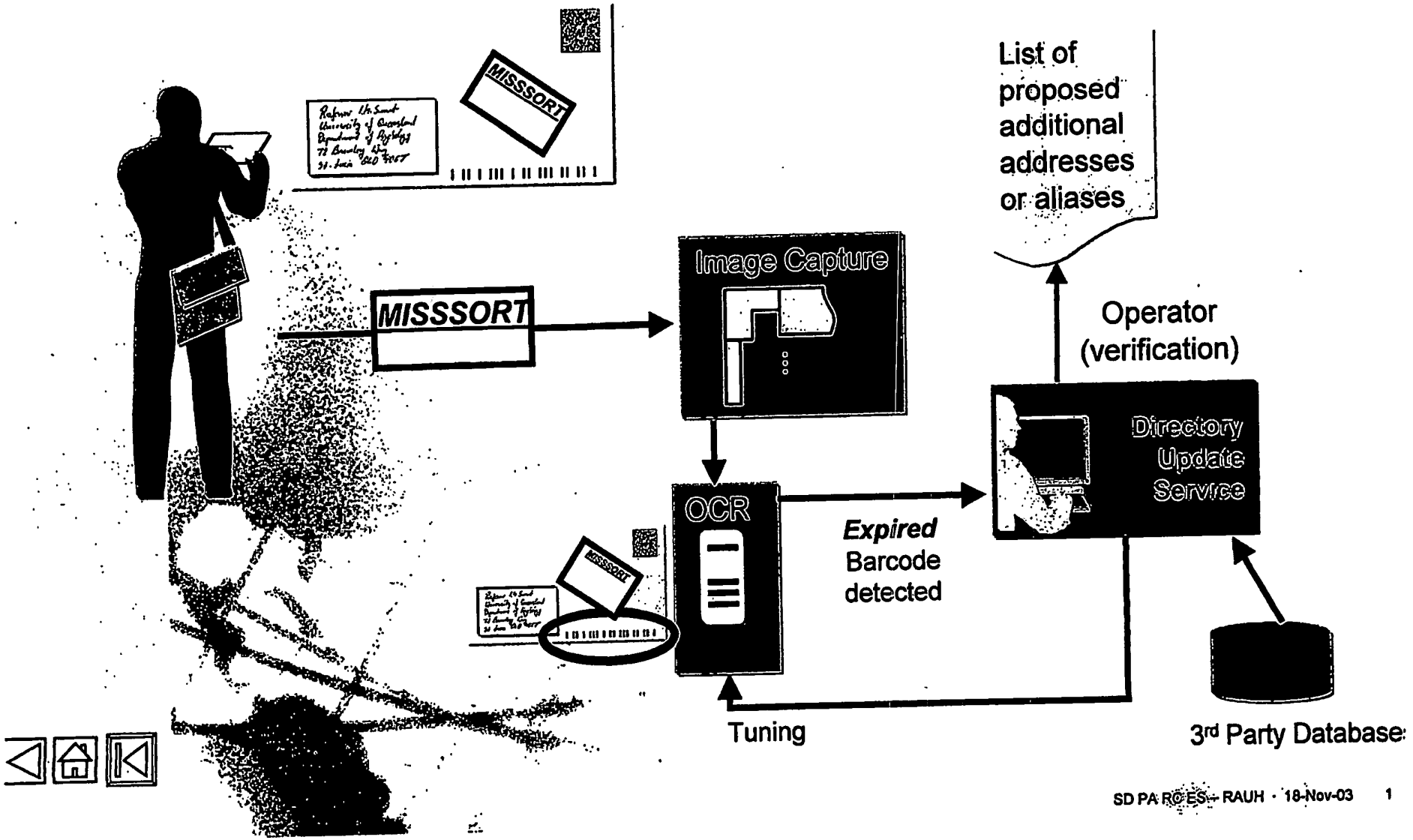
Because of the massive volume of mail, operational mis-sorts tend to get "lost in the scuffle" with the only feedback to Australia Post coming from spot-checking. Great stride in service quality can be achieved if all service errors starting with mis-sorts where caught and characterised. This is the objective of the proposed data mining application.

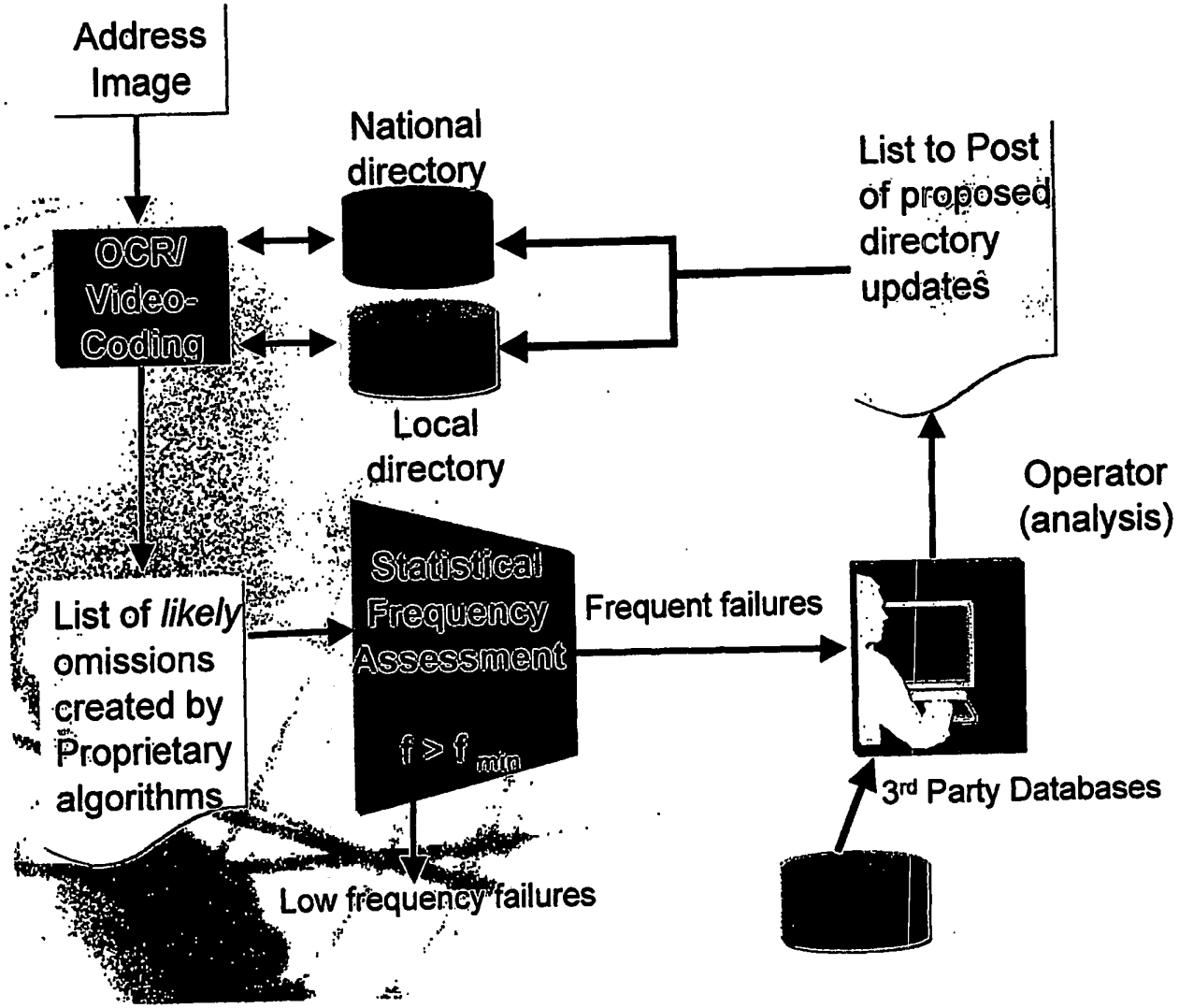
RC 2000 based Data Mining means that we are able to warehouse network-wide, unbiased information so they can be analysed by statistical inference and clustering methods to highlight trends or causative relationships. Sorting and System Error Isolation starts by instructing postmen to tag with a pre-printed sticker every mail piece they observe during their routes to be mis-sorted. These mail pieces are then put back into the outbound mail. Upon outward sorting, the previously printed ID Tag bar code is detected and from its expiration we can recognise a given mail piece has re-entered the network. Smart Read is invoked to determine whether it has a postman affixed mis-sort tag or, for example, whether it is a Return to Sender mail item.

If a mis-sort tag is detected, the mail piece is logged into the data warehouse and is sent for special video coding along with its original resolution as indicated by the ID Tag. If the special video coding yields a different resolution, we now have a data item for future analysis. The processes continues until the mass of such data allows us to Data Mine and detect patterns indicating for example directory omissions, interpretation algorithm problems or even scanner/mechanical problems in specific pieces of equipment at given locations.

The above Data Mining System and Error Isolation is also a cornerstone for expanding the utility of the Siemens IT Postal Service Quality Monitoring System that can also be ID Tag driven and for example would cull and data mine information from mail piece network transit times.

Data Mining Applied to Missort Detection &Correction




Address Image
National directory
List to Post of proposed directory updates
OCR/ Video-Coding
Local directory
Operator (analysis)
Statistical Frequency Assessment
$f > f_{min}$
Frequent failures
List of *likely* omissions created by Proprietary algorithms
3rd Party Databases
Low frequency failures

3G Royal Mail Video Coding Keying Rules and Performance Model

Overview

It appears that the major hurdle in RM Video Coding is reliably defining outward for OCR Retry purposes. The Inward AKS is very similar to An Post -- fairly regular. Outward, however, has very ambiguous format that can range from 1 to 4 lines for any given address. (Figure 1)

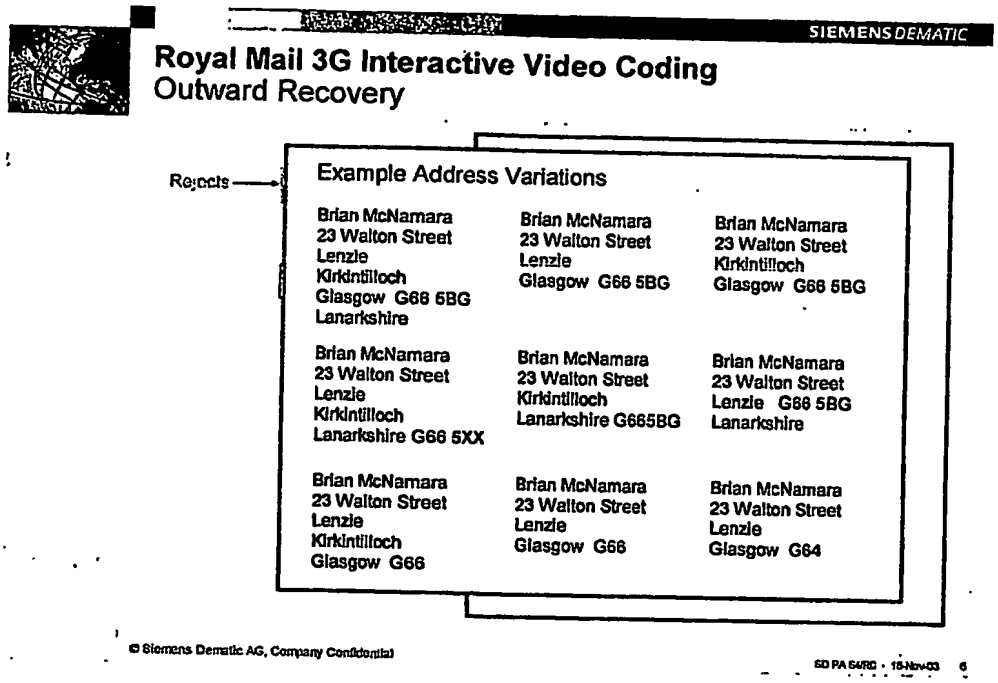


Figure 1

The Double SKS formulation described herein will be relatively easy to learn/apply, robust/fail soft (so we can automatically back-out and restart) (Last Charts) and that has good uniqueness when we consider the 45K combinations that can represent legal UK outward destinations.

The basic rules are:

1. No Post Code Present (Chart 3)

General Rule/Concept: Two 3-character SKSs starting from the bottom of the address
Examples of Double SKS (DSKS): (Chart 2)

Focus: Bottom outward lines of the address

Particulars:

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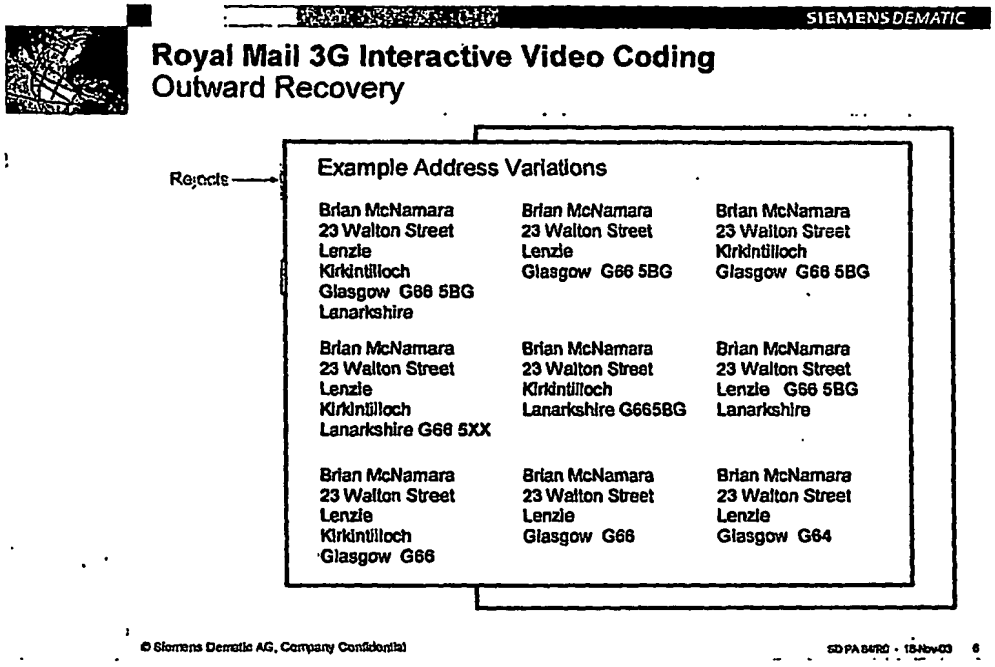

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1. No Post Code Present (Chart 3)

General Rule/Concept: Two 3-character SKSs starting from the bottom of the address
Examples of Double SKS (DSKS): (Chart 2)

Focus: Bottom outward lines of the address

Particulars:

a. *If No County*[1] -- enter DSKS from bottom 2 outward lines of address
If only one outward address line -- enter an SKS plus <sp>

b. *If County is present* and IF we have:

- 2 or more Outward lines above County;
  THEN; ignore County and enter DKSs from next 2 address lines

- only one Outward address line -- enter DSKS from County and single address line

c. If the operator "infers" one of the Outward address lines because it is obscured (window problem) or not present; they hit <Control> at some point while entering the respective SKS.

Note: For the 5 most common cities, Hotkeys are used instead of SKS

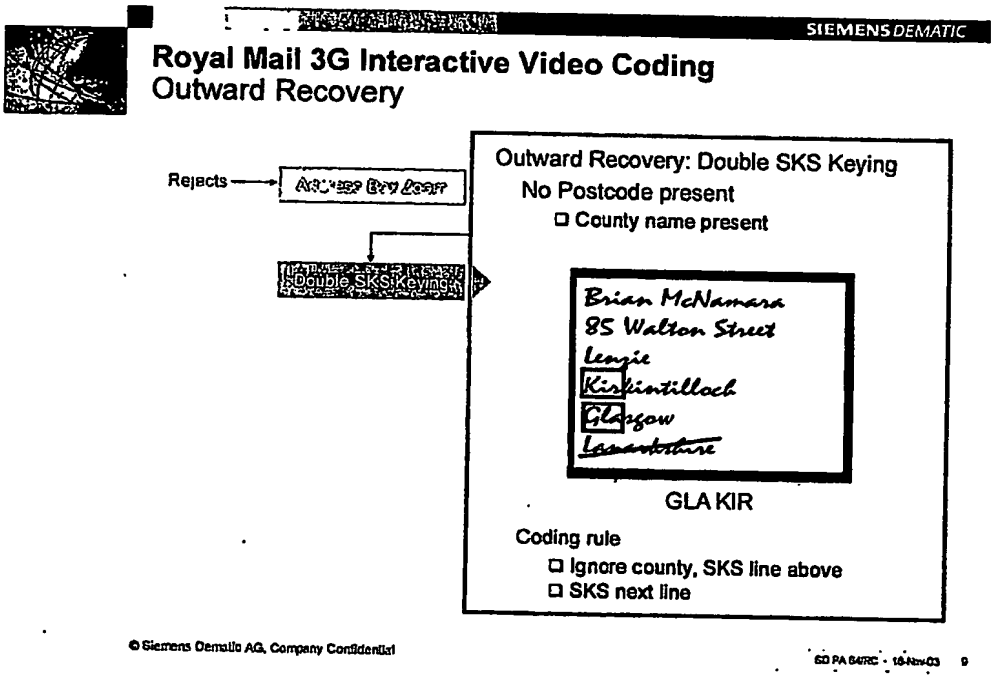

Chart 2

[1] Most common case. In UK addressing county tends not to be used and can also be particularly prone to error

2. Post Code Pr s nt

General Rule/Concept:: First 3 Post Code Left Zone characters plus SKS of "adjacent" city/district/suburb (Chart 3)

Focus: Post Code and adjacent Outward information

Particulars:

a. Enter 3 left-most Post Code characters + SKS from Outward city/district/suburb either on the same line as Post Code or if Post Code is standalone enter SKS from line immediately above Post Code.

b. **If** city name adjacent to Post Code is one of the Hotkey names (from previous coding rules for No Post Code Present), **THEN** we skip it and enter the SKS from the district/suburb on the line above. If no other Outward address information then enter City using Hotkey.

NOTE: During the keying a <shift> is hit to indicate the first part of the DSKS is a Postal Code

The Control key is hit if said characters are obscured and being entered based on intuition. (chart 4)

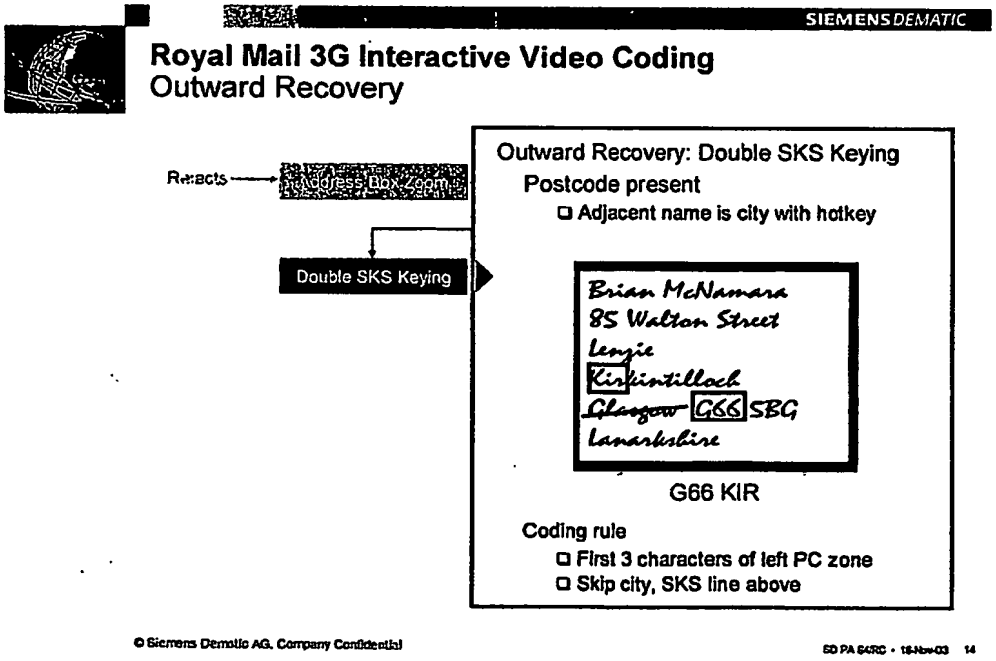

Chart 3

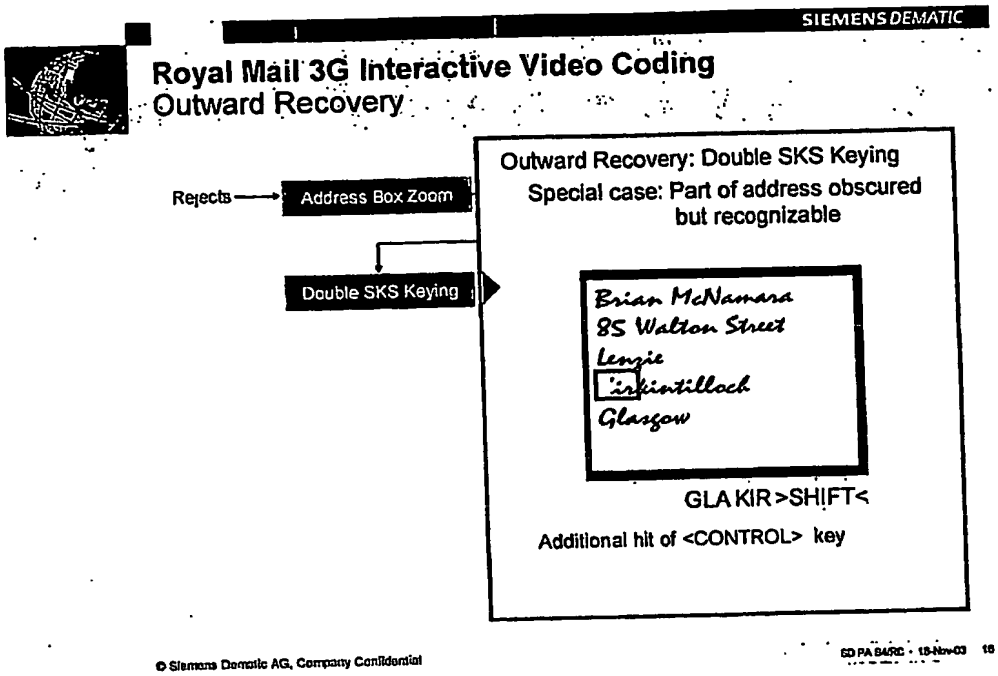

Chart 4

If we reach Selection and the operator sees No Match then they hit: <Restart> which automatically reinitiates processing by breaking the DSKS apart and restarting from each part separately. Since this is high risk, we would only accept a resolution upon Restart after a display to an operator for Validation. **(Charts 5)**

Royal Mail 3G Interactive Video Coding
Outward Recovery

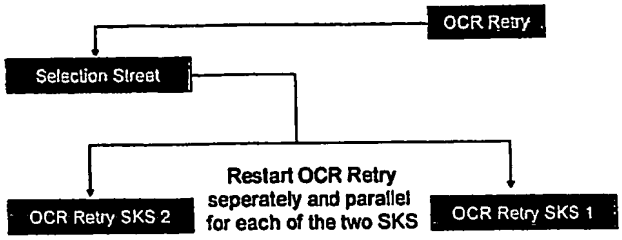

Chart 5

Document made available under the Patent Cooperation Treaty (PCT)

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